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SEQUENCE LISTING Ditzel, H. Burton, D. Schaller, M. <120> Autoantibodies to glucose-6-phosphate isomerase and their participation in autoimmune disease <130> 1361.005US2 <140> US 10/630,009 <141> 2003-07-29 <150> US 09/828,708 <151> 2001-04-06 <160> 123 <170> FastSEQ for Windows Version 4.0 <210> 1 <211> 109 <212> PRT <213> Homo sapiens <400> 1 Pro Asp Ser Leu Ala Val Ser Leu Gly Glu Arg Ala Thr Ile Asn Cys 10 Lys Ser Ser Gln Ser Val Phe Tyr Thr Ser Asn Asn Lys Asn Tyr Leu 25 Ala Trp Tyr Gln Gln Lys Pro Gly Gln Pro Pro Lys Leu Leu Ile Tyr 40 Trp Ala Ser Thr Arg Glu Ser Gly Val Pro Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Ser Leu Gln Ala Glu 75 Asp Val Ala Val Tyr Tyr Cys Gln Gln Tyr Tyr Asp Ser Tyr Thr Phe 90 Gly Gln Gly Thr Lys Leu Glu Ile Lys Arg Thr Val Ala <210> 2 <211> 104 <212> PRT <213> Homo sapiens Pro Ser Phe Leu Ser Ala Ser Val Gly Asp Arg Val Thr Ile Thr Cys 10 Arg Ala Ser Gln Gly Ile Ser Ser Tyr Leu Ala Trp Tyr Gln Leu Lys 25 Pro Gly Lys Ala Pro Lys Leu Leu Ile Tyr Ala Ala Ser Thr Leu Gln 40 Ser Gly Val Pro Ser Arg Phe Ser Gly Ser Gly Ser Gly Thr Glu Phe 55 Thr Leu Thr Ile Ser Ser Leu Gln Pro Glu Asp Phe Ala Thr Tyr Tyr 75 Cys Gln Gln Leu Asn Ser Tyr Pro Leu Thr Phe Gly Gly Gly Ala Lys Val Gly Ile Arg Arg Thr Val Ala

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Lys Pro Gly Gln Ala Pro Arg Leu Leu Ile Tyr Gly Ala Ser Ser Arg
Ala Thr Gly Ile Pro Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp
Phe Thr Leu Thr Ile Ser Arg Leu Glu Pro Glu Asp Phe Ala Val Tyr
Tyr Cys Gln Gln Tyr Gly Ser Ser Pro Arg Thr Phe Gly Gln Gly Thr
Lys Val Glu Ile Lys Arg Thr Val Ala
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Ala Trp Tyr Gln Gln Lys Pro Gly Gln Pro Pro Lys Leu Leu Ile Tyr
                            40
Trp Ala Ser Thr Arg Glu Ser Gly Val Pro Asp Arg Phe Ser Gly Ser
                        55
Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Ser Leu Gln Ala Glu
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Asp Val Ala Val Tyr Tyr Cys Gln Gln Tyr Tyr Asp Ser Tyr Thr Phe
Gly Gln Gly Thr Lys Leu Glu Ile Lys Arg Thr Val Ala
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Arg Pro Gly Gln Ala Pro Arg Leu Leu Ile Tyr Gly Ala Ser Ser Arg
                            40
Ala Thr Gly Ile Pro Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp
                        55
Phe Ser Phe Thr Ile Ser Ser Leu Gln Pro Glu Asp Thr Gly Thr Tyr
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Tyr Cys Gln Gln Tyr Asp Asn Val Pro Asp Thr Phe Gly Gln Gly Thr
Arg Leu Glu Ile Lys Arg Thr Val Ala
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Arg Ala Ser Gln Ser Val Ser Ser Ser Tyr Leu Ala Trp Tyr Gln Gln
Lys Pro Gly Gln Ala Pro Arg Leu Leu Ile Tyr Gly Ala Ser Ser Arg
Ala Thr Gly Ile Pro Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp
Phe Thr Leu Thr Ile Ser Arg Leu Glu Pro Glu Asp Phe Ala Val Tyr
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Tyr Cys Gln Gln Tyr Gly Thr Ser Pro Leu Phe Gly Gln Gly Thr Arg
Leu Glu Ile Lys Arg Thr Val Ala
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Lys Pro Gly Gln Ala Pro Arg Leu Leu Ile Tyr Gly Ala Ser Ser Arg
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Ala Thr Gly Ile Pro Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp
Phe Thr Leu Thr Ile Ser Arg Leu Glu Pro Glu Asp Phe Ala Val Tyr
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Tyr Cys Gln Gln Tyr Gly Ser Ser Pro Arg Thr Phe Gly Gln Gly Thr
Lys Val Glu Ile Lys Arg Thr Val Ala
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Ala Ser Gly Phe Thr Phe Ser Ser His Gly Ser His Trp Val Arg Gln
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Ala Pro Gly Lys Gly Leu Glu Trp Val Ala Leu Leu Ser Ser Asp Gly
                            40
Ser Asn Lys Phe Tyr Ile Glu Ser Val Lys Gly Arg Phe Thr Ile Ser
Lys Asp Asn Ser Lys Asn Thr Leu Tyr Leu Gln Met Asn Ser Leu Arg
                                        75
Ile Asp Asp Thr Ala Val Tyr Tyr Cys Ala Ile Ser Leu Val Gly Thr
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Thr Ala Phe Asn Tyr Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser
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Ala Pro Gly Lys Gly Leu Glu Trp Val Ala Leu Leu Thr Met Asp Arq
Phe Thr Ile Ser Arg Asp Asn Ser Lys Asn Thr Leu Tyr Leu Gln Leu
Ser Ser Leu Arg Pro Glu Asp Thr Ala Val Tyr Tyr Cys Thr Asn Ser
Glu Val Gly Ala Thr Ala Phe Asp Tyr Trp Gly Gln Gly Thr Leu Val
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Thr Val Ser Ser
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Ala Ser Gly Phe Thr Phe Ser Ser Tyr Thr Phe His Trp Val Arg Gln
Ala Pro Gly Lys Gly Leu Glu Trp Val Ala Val Ile Ser Tyr Asp Gly
                            40
Asn Lys Lys Tyr Tyr Ala Asp Ser Val Lys Gly Arg Phe Thr Ile Ser
Lys Asp Asn Ser Lys Asn Thr Leu Tyr Leu Gln Met Asn Ser Leu Arg
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Val Glu Asp Thr Ala Val Tyr Tyr Cys Ala Ile Ser Ile Val Gly Thr
Thr Ala Phe Asn Tyr
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Ala Ser Gly Asn Thr Phe Thr Gly His His Ile His Trp Val Arg Gln
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Ala Pro Gly Gln Gly Leu Gln Trp Met Gly Arg Ile Asn Pro Thr Gly
                            40
Gly Gly Val Ser Leu Ala Gln Ser Phe Gln Asp Arg Val Ser Leu Thr
                        55
Arg Asp Arg Ser Ser Asn Thr Val Phe Leu Glu Leu Ser Gly Leu Thr
                                        75
Glu Glu Asp Thr Ala Leu Tyr Phe Cys Ala Arg Pro Arg Phe Asn Met
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Ile Arg Glu Pro Leu Asp Leu Trp Gly Gln Gly Thr Val Val Thr Val
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Ser Ser
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Thr Ser Gly Phe Ile Phe Asn Ser Tyr Ala Met Asn Trp Val Arg Gln
Ala Pro Gly Lys Gly Leu Glu Trp Val Ser Arg Ile Ser Gly Asn Ser
                            40
Gly Ser Thr Phe Tyr Ala Asp Ser Val Lys Gly Arg Phe Thr Ile Ser
                        55
Arg Asp Asn Ser Lys Asn Thr Ala Phe Leu Arg Met Asn Ser Gln Arg
Ala Glu Asp Thr Ala Val Tyr Tyr Cys Ala Lys Asp Leu Ser Ser Gly
                85
                                    90
Ala Tyr Tyr Tyr Gly Met Asp Val Trp Gly Gln Gly Thr Thr Val
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                                105
Thr Val Ser Ser
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Gly Pro Gly Leu Val Arg Pro Ser Gln Thr Leu Ser Leu Thr Cys Pro
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Val Ser Pro Gly Ser Ile Lys Gly Asp Ser Tyr Phe Trp Ser Trp Val
Arg Gln Pro Val Gly Lys Gly Leu Glu Trp Ile Gly Arg Ile Tyr Gly
                            40
Arg Gly Thr Thr Asn Tyr Asn Arg Val Phe Gly Ser Arg Val Ser Met
Ser Val Asp Met Ser Arg Ser Gln Phe Phe Leu Glu Leu Arg Asp Val
Thr Ala Ala Asp Thr Ala Val Tyr Tyr Cys Ala Arg Asp Lys Gly Ser
               85
Glu Tyr Ser Tyr Phe Asp Pro Trp Gly Gln Gly Ile Val Val Asn Val
            100
Phe Ser
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Gly Ala Glu Val Lys Lys Pro Gly Ser Ser Val Lys Val Ser Cys Arg
Ala Ser Gly Gly Thr Phe Ser Arg Tyr Ala Ile Ser Trp Val Arg Gln
Ala Pro Gly Gln Gly Leu Glu Trp Met Gly Gly Ile Ile Pro Pro Phe
       35
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Gly Pro Val Asn Tyr Ala Gln Lys Phe Gln Gly Arg Val Thr Ile Thr
                       55
Ala Asp Asp Ser Thr Asn Thr Ala Tyr Met Gly Leu Ser Ser Leu Arg
Ser Gly Asp Thr Ala Val Tyr Tyr Cys Ala Arg Val Ala Tyr Asp Gly
                                   90
Ser Gly Tyr Tyr Asn Asn Ile Pro Lys Ile Tyr Tyr Tyr Ser Tyr Met
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Asp Val Trp Gly Lys Gly Thr Thr Val Thr Val Ser Ser
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Ser His Thr Met His
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Ser Tyr Thr Phe His
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Gly His His Ile His
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Ser Tyr Ala Met Asn
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<212> PRT
<213> Homo sapiens
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Gly Asp Ser Tyr Phe Trp Ser
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Arg Tyr Ala Ile Ser
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Leu Leu Ser Ser Asp Gly Ser Asn Lys Phe Tyr Ile Glu Ser Val Lys
Gly
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Leu Ile Phe Tyr Asp Gly Ser Asn Lys Tyr Tyr Ala Asp Ser Val Lys
Gly
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Val Ile Ser Tyr Asp Gly Asn Lys Lys Tyr Tyr Ala Asp Ser Val Lys
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Gly
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Arg Ile Asn Pro Thr Gly Gly Gly Val Ser Leu Ala Gln Ser Phe Gln
Asp
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Gly
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Arg Ile Tyr Gly Arg Gly Thr Thr Asn Tyr Asn Arg Val Phe Gly Ser
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Gly Ile Ile Pro Pro Phe Gly Pro Val Asn Tyr Ala Gln Lys Phe Gln
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Gly
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<213> Homo sapiens
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Ser Leu Val Gly Thr Thr Ala Phe Asn Tyr
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Ser Glu Val Gly Ala Thr Ala Phe Asp Tyr
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Ser Ile Val Gly Thr Thr Ala Phe Asn Tyr
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Pro Arg Phe Asn Met Ile Arg Glu Pro Leu Asp Leu
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Asp Leu Ser Ser Gly Ala Tyr Tyr Tyr Tyr Gly Met Asp Val
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Asp Lys Gly Ser Glu Tyr Ser Tyr Phe Asp Pro
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Val Ala Tyr Asp Gly Ser Gly Tyr Tyr Asn Asn Ile Pro Lys Ile Tyr
Tyr Tyr Ser Tyr Met Asp Val
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Lys Ser Ser Gln Ser Val Phe Tyr Thr Ser Asn Asn Lys Asn Tyr Leu
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Ala
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Arg Ala Ser Gln Gly Ile Ser Ser Tyr Leu Ala
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Arg Ala Ser Gln Ser Val Ser Ser Ser Tyr Leu Ala
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Lys Ser Ser Gln Ser Val Phe Tyr Thr Ser Asn Asn Lys Asn Tyr Leu
                                     10
Ala
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Arg Ala Ser Gln Ser Val Ser Ser Ser Tyr Leu Ala
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Arg Ala Ser Gln Ser Val Ser Ser Ser Tyr Leu Ala
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Arg Ala Ser Gln Ser Val Ser Ser Ser Tyr Leu Ala
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Trp Ala Ser Thr Arg Glu Ser
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Ala Ala Ser Thr Leu Gln Ser
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Gly Ala Ser Ser Arg Ala Thr
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 Trp Ala Ser Thr Arg Glu Ser
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 Gly Ala Ser Ser Arg Ala Thr
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 Gly Ala Ser Ser Arg Ala Thr
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 Gly Ala Ser Ser Arg Ala Thr
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 Gln Gln Tyr Tyr Asp Ser Tyr Thr
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 Gln Gln Leu Asn Ser Tyr Pro Leu Thr
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 Gln Gln Tyr Gly Ser Ser Pro Arg Thr
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Gln Gln Tyr Tyr Asp Ser Tyr Thr
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Gln Gln Tyr Asp Asn Val Pro Asp Thr
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Gln Gln Tyr Gly Thr Ser Pro Leu
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<211> 9
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Gln Gln Tyr Gly Ser Ser Pro Arg Thr
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Gly Gly Val Val Gln Pro Gly Arg Ser Leu Lys Leu Ser Cys Ala
Ala Ser Gly Phe Thr Phe Ser
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<211> 23
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Gly Gly Val Val Gln Ala Trp Arg Ser Leu Arg Leu Ser Cys Val
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Ala Ser Gly Phe Thr Phe Ser
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Gly Ala Glu Val Arg Lys Pro Gly Thr Ser Val Arg Ile Ser Cys Arg
Ala Ser Gly Asn Thr Phe Thr
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Gly Gly Leu Val Gln Pro Gly Gly Ser Leu Arg Leu Ser Cys Ala
Thr Ser Gly Phe Ile Phe Asn
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Gly Pro Gly Leu Val Arg Pro Ser Gln Thr Leu Ser Leu Thr Cys Pro
Val Ser Pro Gly Ser Ile Lys
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Gly Ala Glu Val Lys Lys Pro Gly Ser Ser Val Lys Val Ser Cys Arg
Ala Ser Gly Gly Thr Phe Ser
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<400> 64
Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val Ala
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Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val Ser
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Trp Val Arg Gln Pro Val Gly Lys Gly Leu Glu Trp Ile Gly
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Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Met Gly
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Arg Phe Thr Ile Ser Lys Asp Asn Ser Lys Asn Thr Leu Tyr Leu Gln
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Met Asn Ser Leu Arg Ile Asp Asp Thr Ala Val Tyr Tyr Cys Ala Ile
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Leu Ser Ser Leu Arg Pro Glu Asp Thr Ala Val Tyr Tyr Cys Thr Asn
            20
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Arg Phe Thr Ile Ser Lys Asp Asn Ser Lys Asn Thr Leu Tyr Leu Gln
                                    10
Met Asn Ser Leu Arg Val Glu Asp Thr Ala Val Tyr Tyr Cys Ala Ile
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Arg Val Ser Leu Thr Arg Asp Arg Ser Ser Asn Thr Val Phe Leu Glu
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Leu Ser Gly Leu Thr Glu Glu Asp Thr Ala Leu Tyr Phe Cys Ala Arq
                                25
<210> 73
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<213> Homo sapiens
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Arg Phe Thr Ile Ser Arg Asp Asn Ser Lys Asn Thr Ala Phe Leu Arg
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Met Asn Ser Gln Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys Ala Lys
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<210> 74
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Arg Val Ser Met Ser Val Asp Met Ser Arg Ser Gln Phe Phe Leu Glu
Leu Arg Asp Val Thr Ala Ala Asp Thr Ala Val Tyr Tyr Cys Ala Arg
           20
                                25
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<211> 32
<212> PRT
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Arg Val Thr Ile Thr Ala Asp Asp Ser Thr Asn Thr Ala Tyr Met Gly
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Leu Ser Ser Leu Arg Ser Gly Asp Thr Ala Val Tyr Tyr Cys Ala Arg
            20
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<210> 76
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Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser
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Trp Gly Gln Gly Thr Val Val Thr Val Ser Ser
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Trp Gly Gln Gly Thr Thr Val Thr Val Ser Ser
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Trp Gly Gln Gly Ile Val Val Asn Val Phe Ser
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Trp Gly Lys Gly Thr Thr Val Thr Val Ser Ser
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Pro Asp Ser Leu Ala Val Ser Leu Gly Glu Arg Ala Thr Ile Asn Cys
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Pro Ser Phe Leu Ser Ala Ser Val Gly Asp Arg Val Thr Ile Thr Cys
                5
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Pro Gly Thr Leu Ser Leu Ser Pro Gly Glu Arg Ala Thr Leu Ser Cys
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Pro Asp Ser Leu Ala Val Ser Leu Gly Glu Arg Ala Thr Ile Asn Cys
                                    10
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Pro Gly Thr Leu Ser Leu Ser Pro Gly Glu Gly Ala Thr Leu Ser Cys
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Pro Gly Thr Leu Ser Leu Ser Pro Gly Glu Gly Ala Thr Leu Ser Cys
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Pro Gly Thr Leu Ser Leu Ser Pro Gly Glu Arg Val Thr Leu Ser Cys
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Trp Tyr Gln Gln Lys Pro Gly Gln Pro Pro Lys Leu Leu Ile Tyr
<210> 89
<211> 15
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<213> Homo sapiens
Trp Tyr Gln Leu Lys Pro Gly Lys Ala Pro Lys Leu Leu Ile Tyr
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Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Arg Leu Leu Ile Tyr
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Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Arg Leu Leu Ile Tyr
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Gly Val Pro Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr
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Leu Thr Ile Ser Ser Leu Gln Ala Glu Asp Val Ala Val Tyr Tyr Cys
                                 25
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Gly Val Pro Ser Arg Phe Ser Gly Ser Gly Ser Gly Thr Glu Phe Thr
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                                    10
Leu Thr Ile Ser Ser Leu Gln Pro Glu Asp Phe Ala Thr Tyr Tyr Cys
            20
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<210> 97
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Gly Ile Pro Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr
                                    10
Leu Thr Ile Ser Arg Leu Glu Pro Glu Asp Phe Ala Val Tyr Tyr Cys
            20
                                 25
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Gly Val Pro Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr
                                    10
Leu Thr Ile Ser Ser Leu Gln Ala Glu Asp Val Ala Val Tyr Tyr Cys
            20
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                                    10
Phe Thr Ile Ser Ser Leu Gln Pro Glu Asp Thr Gly Thr Tyr Tyr Cys
            20
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Leu Thr Ile Ser Arg Leu Glu Pro Glu Asp Phe Ala Val Tyr Tyr Cys
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Leu Thr Ile Ser Arg Leu Glu Pro Glu Asp Phe Ala Val Tyr Tyr Cys
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<211> 14
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<213> Homo sapiens
<400> 102
Phe Gly Gln Gly Thr Lys Leu Glu Ile Lys Arg Thr Val Ala
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<211> 14
<212> PRT
<213> Homo sapiens
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<210> 104
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<210> 105
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Phe Gly Gln Gly Thr Arg Leu Glu Ile Lys Arg Thr Val Ala
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Phe Gly Gln Gly Thr Arg Leu Glu Ile Lys Arg Thr Val Ala
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Phe Gly Gln Gly Thr Lys Val Glu Ile Lys Arg Thr Val Ala
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cacttttgtc gtctgatgga agtaataaat tctatataga atccgtgaag qqccqattca
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ccatctccaa ggacaattct aagaacacac tgtatctgca aatgaacagc ctgaqaattq
                                                                        240
acgacacggc tgtctattac tgtgcgattt ccctggtggg aactaccgct tttaactact
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ggggccaggg aaccctggtc accgtctcct ca
                                                                        332
<210> 110
<211> 331
<212> DNA
<213> Homo sapiens
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agtagtcata ccatgcactg ggtccgccag gctccaggca aggggctqqa qtqqqtqqca
                                                                        120
cttatattct atgatggaag taataaatac tatgcagact ccgtgaaggg ccgattcacc
                                                                        180
atctccagag acaattccaa gaacacgctg tatctgcaat tgagcagcct aagacctgag
                                                                        240
gacacggctg totattattg tacgaattcc gaggtgggag ctaccgcttt tgactactgg
                                                                        300
ggccagggaa ccctggtcac cgtctcctca g
                                                                        331
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<211> 335
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<213> Homo sapiens
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gtggcagtta tatcatatga tggaaacaag aaatactacg cagactccgt gaagggccga
                                                                        180
ttcaccatct ccagagacaa ttccaagaac actctatatc tgcaaatgaa cagcctgaga
                                                                        240
gttgaggaca cggctgttta ttactgtgcg atttccatag tgggaactac cgcttttaac
                                                                        300
tactggggcc agggaaccct ggtcaccgtc tcctc
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<211> 327
<212> DNA
<213> Homo sapiens
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                                                                       120
cagcctccta agttgctcat ttactgggca tccacccggg aatccggggt ccctgaccga
                                                                       180
ttcagtggca gcgggtctgg gacagatttc actctcacca tcagcagcct gcaggctgaa
                                                                       240
gatgtggcag tttattactg tcagcaatat tatgattcgt acacttttgg ccaggggacc
                                                                       300
aagctggaga tcaaacgaac tgtggct
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<210> 113
<211> 312
<212> DNA
<213> Homo sapiens
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ggcattagca gttatttagc ctggtatcag ctaaaaccgg ggaaagcccc taagctcctg
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atctatgctg catccacttt gcaaagtggg gtcccatcaa ggttcagcgg cagtggatct
                                                                       180
gggacagaat tcactctcac aataagcagc ctgcagcctg aagattttgc aacttattac
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tgtcaacagc ttaatagtta ccctctcact ttcggcggag gggccaaggt ggggatcaga
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cgaactgtgg ct
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<210> 114
<211> 315
<212> DNA
<213> Homo sapiens
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<210> 116 <211> 315 <212> DNA <213> Homo	sapiens					
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<210> 117 <211> 312 <212> DNA <213> Homo	sapiens					
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<210> 118 <211> 315 <212> DNA <213> Homo	sapiens					
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<211> 342
<212> DNA
<213> Homo sapiens
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                                                                        120
atgggaagaa tcaacccgac tggcggcggc gttagtctcg cacaqagttt ccaqqacaqa
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gtcagcctga ccagggacag gtcgtccaat acagtcttct tggaactgag cggcctcacq
                                                                        240
gaggaggaca cggccttata tttctgtgcg aggccccgat ttaacatgat ccgggaacct
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cttgacctct ggggccaggg gacagtggtc accgtctcct ca
                                                                        342
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<211> 348
<212> DNA
<213> Homo sapiens
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gtctcacgta ttagtggaaa tagtggaagc acattctacg cagactccgt gaagggccgg
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ttcaccatct ccagagacaa ttccaagaac acggcgtttc tgcgaatgaa cagccagaga
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gccgaagaca cggccgttta ttactgtgcg aaagatctgt cgagtggtgc atactactac
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gagtggatag ggcgtatcta cggcagaggg actaccaatt acaaccgtgt tttcgggagt
                                                                       180
cgagtcagta tgtcagtgga catgtccagg agtcagtttt tcttggaatt gagagatgtg
                                                                       240
accgccgcag acacggccgt ctattactgt gcgagagaca aggggtccga atactcctac
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tcacgattac cgcggacgat tccacgaaca cagcctacat gggtctgagc agcctgagat
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ctggggacac ggccgtgtat tactgcgcga gagtggccta tgatggtagt ggctattaca
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acaatatccc aaagatctac tactactcct acatggacgt ctggggcaaa gggaccacgg
                                                                       360
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<210> 123
<211> 5
<212> PRT
<213> Artificial Sequence
<220>
<223> A synthetic flexible five amino acid tether.
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